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A STUDY OF FLOATING USE ON THE THE CHATTOOGA WILD AND SCENIC RIVER

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ABSTRACT

Floating use on the Chattooga Wild and Scenic River has increased from less than 100 floaters in the mid 1960's to 36,000 in 1979. This paper presents a review of management actions that have been implemented to date. It examines use patterns that have developed over the years as reflected by analysis of floater self registration slips. It examines the limited research findings available to date and indicates direction for future studies. It recommends policies to be utilized to regulate commercial use which constitutes two thirds of the total use.

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A. INTRODUCTION

A Wild and Scenic River is a fragile resource in both an ecological and an aesthetic sense. The manager is challenged to provide for the use of these areas by the public while maintaining the river corridor in a substantially unmodified form.

The Act states that "Each Component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included in said System without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its aesthetic, scenic, historic, archaeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development based on the special attributes of the area."

An objective will be "to provide a range of recreation opportunities characteristic of, and in harmony with, the nature of the individual river segments."

An important and probably essential characteristic of a wild river is limited use so that the natural attractions are the predominant feature. However, if wildness is not to be self defeating, there must be a compromise between complete wildness with no visitors and at the other extreme providing any and all wild river experience; some middle ground is unavoidable if the well established social goal of providing an opportunity to experience the wild river is to be maintained. But where to draw the line and establish the middle ground?

Floating use on the Chattooga River has grown for an estimated 800 persons in 1970 to 36,666 who registered in 1979. Neither the Act or the approved plans for the Chattooga set a limit on how floating use will be regulated. This paper is a review of the management of the Chattooga and a discussion of possible courses of action for the future in order to protect the river environment while maximizing visitor enjoyment.

B. STUDY OBJECTIVES

This study was undertaken as a requirement for a Clemson University Recreation Management short course and to provide guidance for managers involved with the Chattooga. It seeks to pull together into one place what has happened on the river. It trys to analyze the data to see how to maximize the Chattooga's benefits while reducing the conflicts between various groups of floaters.

The floating use on the Chattooga is beginning to stabilize and develop in to patterns after the very rapid changes when use was just beginning ten to fifteen years ago.

C. BACKGROUND INFORMATION ON THE RIVER

1. Location - The Chattooga begins in mountainous North Carolina south of the town of Highlands and flows 10 miles before leaving the state. It then forms the border between Georgia and South Carolina for 40

miles before ending at Lake Tugaloo. The West Fork, a major tributary, joins the main river at mile 24.2 (measured from the mouth).

Over its 50 mile course it decends 2469 feet (an average of 49.4 feet/mile) from an altitude of 3360 feet to 891 feet. This rapid drop creates numerous rapids and falls and provides some of the best white water in the eastern United States.

2. Designation History - In 1968 the Chattooga was nominated as a "study river" by the Wild and Scenic Rivers Act (PL 90-542) and became a national wild and scenic river in 1974 9PL 93-279). The Chattooga River received only limited use, either from floater or from bank oriented activities like fishing and hiking until its nomination as a wild and scenic river. This is probably due to the publicity in local and regional newspapers and in other news media coupled with the general interest in forest type recreation in the late 1960's. Subsequent publication of the book Deliverance, considered by many to have been written about the Chattooga, and the filming of the movie Deliverance on the Chattooga gave further notoriety to this free flowing river. The result of this publicity was a massive increase in use of the river and its corridor.

   The Forest Service USDA was given responsibility for managing the river with its designation as a wild and scenic river. In 1975 the Regional Forester assigned responsibility for administering floating use on the main river to the Francis Marion-Sumter National Forests since almost all the access points lie in South Carolina.

3. River Characteristics - The Chattooga offers a wide range of floating conditions, from portions of flat water up to two miles long to rugged portions with Class 4 and 5 rapids back to back. When boaters first discovered the river in the late 1960's and early 1970's many lacked the knowledge and equipment to safely run it. Numerous fatalities occurred before safety regulations were imposed in the mid-1970's.

   The first twenty-six miles of the river are closed to all floating use as the river is generally too small for floating during most water levels. This also provides an area where people can fish and hike without encountering boating traffic.

   The floatable portions have been divided into four sections (I through IV). Section I is a tributary stream known as the West Fork which is entirely in Georgia. The float begins at a parking/launch area at river mile 27.7 (measured from the mouth), and it ends at mile 24.2 at the newly-constructed Highway 28 parking/launch area on the main river. This is a very mild section with about fifteen rapids in the Class 1 to 2 range. The stream is generally about 30 feet wide and offers a good opportunity for beginners to practice boating skills before trying more difficult portions.

   Most floaters on Section II will enter at the new Highway 28 parking/launch area and will get out at river mile 17.4 at Earl's Ford. This section of the river varies from sixty to one hundred twenty-five feet wide and has about twenty-five Class 1 and 2 rapids and one Class 3 rapid (Big Shoals). It is a good area that is safe

for beginners who often capsize, and it is also good tubing water. It does not have enough heavy water to be challenging for commercial raft trips.

Section III begins at Earl's Ford and ends at the Highway 76 bridge at river mile 6.0. Additional access points on this section are at Sandy Ford in both South Carolina and Georgia, and Fall Creek and Tilly Branch in South Carolina. It is a much more difficult portion than Section II with about sixty-two rapids Class 2, four Class 3, three Class 4, and one Class 5. The river varies in width from sixty to one hundred twenty-five feet. It is the heaviest used section of the river by private users.

Section IV begins at Highway 76 and drops rapidly to Tugaloo Lake. It is by far the most difficult section open to boating. It contains about thirty-seven rapids Class 2, two Class 3, four Class 4, four Class 5 and one Class 6. This portion of the Chattooga is the most heavily used section by the commercial raft companies. Their use would be higher if present Forest Service regulations were not in force as there is more demand on weekends than is presently permitted. Many of the commercial trips that begin on the lower portion of Section III (Fall Creek and Tilly Branch) end at Woodall Shoals which is two miles into Section IV. Since the Section IV commercial trips begin at Highway 76, this two mile overlap causes the Highway 76 - Woodall Shoals to be the most heavily used section of the river. However, this is not the problem it could be, since most of the trips starting on Section III arrive at the bridge in the afternoon while Section IV trips are floating this section in the morning.

4. Use Patterns and Trends - Table 1 shows the estimated number of floaters on the Chattooga by years. The river experienced a very rapid increase in usage between 1967 and 1974, and then the increase leveled off and began to fluctuate widely. A substantial increase was registered in 1979 which is interesting in light of the increased gasoline prices. This can be partly attributed to favorable water levels.

TABLE 1

ESTIMATED NUMBER OF FLOATERS ON CHATTOOGA

YEAR	TOTAL USE	COMMERCIAL PORTION	REMARKS
1967	100		
1968	100		
1969	300		Wild & Scenic River Study Begins
1970	800		
1971	800		
1972	7,600		Movie "Deliverance" Made
1973	21,000		
1974	28,800		
1975	22,800	7,423	First Year Registration & Accurate Counting
1976	17,100	10,233	
1977	17,400	13,089	Very Low Water
1978	30,000	20,000	
1979	36,666	23,294	First year guides included in commercial portion

The amount of floaters is correlated with water temperature and summer vacation. Private use usually peaks earlier in the summer than commercial use as private users are more knowledgeable about favorable water levels. Table 2 shows the use pattern by months and reveals the concentration during the summer.

TABLE 2

FLOATING USE BY MONTHS

MONTH	PRIVATE INDIVIDUAL	COMMERCIAL	TOTAL
JAN	19	0	19
FEB	11	0	11
MAR	242	300	542
APR	938	1331	2269
MAY	1538	2604	4142
JUN	2362	3181	5543
JUL	2743	4571	7314
AUG	2730	5397	8127
SEP	1814	3245	5059
OCT	671	1595	2266
NOV	264	0	264
DEC	37	0	37
	13382	23294	36676

22% 55.9% 88.5%

Table 3 shows the amount of use that occurred on each day during 1979 by private and total use. The commercial figure can be obtained by subtracting the smaller figure in a block (the private) from the larger figure (the total).

TABLE 3

FLOATING USE BY DAYS

	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC	
	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL	PVT	TOTAL
1		2	2				4	4	34	97	0	70	48	207	267	448	38	176	> 187	373	4	15			>	
2									1	23	0	63	129	262	30	186	57	180	> 296	497	4	4	4	4	>	
3			>		>	13	13				0	80	132	197	72	226	35	218	> 122	314	14	35	>	47	47		
4			>		>	4	4				21	135	20	47	85	157	> 400	636	11	63	7	7	>	37	37		
5									3	3	> 137	253	3	75	41	180	> 239	469	2	49	28	85	3	3		
6	>					2	2		16	16	> 57	174	18	94	44	216	32	188	5	26	> 64	281				
7	>							>	81	210	17	76	22	164	> 205	415	18	228	21	102	> 42	239	2	2		
8								>	75	115	15	40	32	169	> 151	295	12	193	> 234	446	21	90			>	8	8
9						4	21		4	29	11	54	> 210	305	50	118	16	214	> 112	349	8	20			>	2	2
10			>		>	22	22		0	23	3	49	> 174	261	16	153	55	294	9	265	8	36	>	32	32		
11			>		>	7	7		19	64	6	84	24	144	36	110	> 286	503	11	75	5	5	>	25	25		
12						4	23		8	30	> 112	240	14	101	66	197	> 255	478	13	79	30	69	3	3		
13	>					2	2		6	28	> 72	97	69	112	22	219	74	212	4	75	> 56	264				
14	>					3	3	>	39	135	6	96	41	149	> 304	488	59	305	2	120	> 26	139				
15								>	62	68	13	115	55	219	> 234	463	60	334	> 131	311	0	14			>	
16						4	4		0	23	21	102	> 122	254	44	151	40	273	> 164	373	7	7	9	9	>	7	7
17			>		>	32	84		11	11	9	61	> 115	144	35	217	36	276	6	62			>	26	26	2	2
18			>		>	22	43		8	34	68	197	20	109	21	191	> 318	537	29	79	36	36	>	13	13		
19									13	13	> 213	366	71	187	49	174	> 179	416	8	48	33	91				
20	>	4	4			14	14		20	106	> 111	223	101	290	36	232	29	214	4	78	> 61	219				
21	>					4	4	>	140	345	28	142	65	200	> 196	379	52	201	37	128	> 58	231	4	4		
22						15	15	>	131	253	11	155	58	228	> 109	328	25	186	> 96	296	12	12	3	3	>	3	3
23						22	22		10	100	23	105	> 318	481	32	156	19	128	> 120	194			27	27	>		
24			>	4	4	> 19	36		24	24	16	102	> 169	208	36	219	75	211	0	52	6	31	>	19	19		
25			>			> 16	16		10	40	37	135	10	97	25	202	> 134	364	8	55	6	6	>	2	2		
26				2	2	2	16		0	45	> 226	377	33	137	61	243	> 71	289	24	54	10	45	5	5		
27	>	2	2								> 200	349	27	135	58	262	16	109	8	37	> 53	163	3	3		
28	>	11	11		5	5	4	4	>	82	242	70	174	14	138	> 215	419	29	162	15	115	> 68	118				
29							4	18	>	120	283	12	68	71	155	> 168	378	13	105	> 95	292	4	4			10	10
30							1	69		21	21	13	113	> 187	274	23	117	23	174	> 40	95						
31						>	34	92				11	67			20	178	35	158								
	19	19	11	11	258	538	938	2381	1539	4362	2372	5543	2751	7717	2730	8431	1814	5102	671	2266	264	264	32	32		

Comm = Total less Pvt.

> Denotes Weekends

Table 4 shows the type craft launched by private individuals at the different launch points. Earl's Ford was the major private entry point with 5062 craft or 57.4% of the total private launches.

TABLE 4

TYPE CRAFT BY LAUNCH POINT (PRIVATE ONLY)

POINT	# CANOES	# RAFTS	# KAYAKS	# INNER TUBES	TOTAL
Westfork		2	13	37	123
HW 29 Bridge	991	191	225	320	1727
Long Bottom	56	21	32	42	151
Earl's Ford	2489	748	1823	2*	5062
Sandy Ford	2		4		6
Fall Creek	53	51	47		151
Tilly Branch	10	5	18		33
HW 76	317	200	1059		1576
Woodall Shoals	1	2	13		15
	4888	1220	3234	401	8844

* Tubes are not permitted below Earl's Ford.

5. Definitions that have developed on the Chattooga follow:

Tubber - Any individual floating the river in an innertube. This use is restricted to Sections I and II and is generally limited to the warmer months of June - August.

Floater - A person using any deivce, canoe, kayak, raft, innertube to float down the river.

Commercial User - A person who pays to travel with one of the regularly scheduled raft services or instructional clinics.

Clinic - A commercial trip primarily for instruction in white water boat handling rather than simply floating the river. Clinics generally have a less than twelve students and move down the river slowly as they discuss how to run a particular rapid.

Nonprofit Orgainzed Group - Any party where use of the river is not the primary purpose of the organization and no profit is incurred. Examples are universities, scouts and some summer camps. Camps generally run Section II while universities often run III. These groups probably have the largest number of boats per party using the river.

Individual Floater - These are people who join together to float the river without money (other than possibly for transporation) changing hands. During 1979 they numbered over 13,000. This group has the largest number of repeat users and have the greatest boating skill outside of the commercial guides. However, the group also contains novice floaters who get into numerous situations requiring skills they do not possess. Other users (frequently commercial) may have to assist them to enable them to complete the trip successfully. Almost no overnight trips are made since conditions are not condusive to carrying camping gear.

Commercial - This is the largest group of users and consists of three rafting companies and seven commercial clinics operating under special use permit. During 1979 their use including guides totaled about 23,294. The raft contracts are in the third year of a five year permit while the clinics are under an annual permit. Restrictions have been placed on their operation to limit how many people they can carry, on what portions of the river they can float and at what times they can launch.

6. Objectives for managing the river - The Act establishing the Chattooga as a Wild and Scenic River states objectives for each class (wild, scenic and recreational) that are contained in the Management Plan on pages 2 and 3. In general the classification was based on land condition when the river was studied in the late 1960's when numerous "improvements" like houses, fields, bridges and access roads existed. Now most of these man made features have been removed with the exception of the bridges. From the stand point of floating use all three classifications are managed in the same way since a floater will pass through several classification or any trip i.e. began in a recreation portion and end in a wild section. Thus it is probably more important to look at a river section i.e., II or III as a unit and try to set objectives for floating experiences section by section.

7. Regulations applied to floaters - In the early 1970's numerous deaths occurred as floaters with substandard equipment, lack of boating skills and no knowledge of the Chattooga came to pit themselves against the unforgiving river. In 1975 regulations were implemented requiring a) personal floating devices (life jackets) to be worn at all times, b) requiring a minimum of two craft on more difficult sections and c) helmets on all decked boat users and floater below Woodall Shoals. These regulations had a very positive effect in reducing the death toll.

These regulations probably caused some potential users to not use the Chattooga, but the number is not believed to be significant. A more significant factor in holding down the number of users occurred as access roads were closed at the river corridor, and users were required to walk in. This action required portage of 200 - 800 yards at all access points except those along Highway 28 and the West Fork.

In a study by Gordon Howard in 1975 before most of these closures were made, more respondents favored a 1/4 mile portage than opposed it (favor 46.5%, neutral 20.3% and oppose 33.2%). There was a drop in reported usage in 1976 but a later question study by Howard (unpublished) did not show a strong correlation between Forest Service management actions and the decline.

To date no restrictions have been placed on how many non-commercial floaters can use the river. All people are free to use the river any time they desire, the only requirement being that they register themselves at the entry point and meet the safety requirements.

However, there have been several limitations placed on the commercial sector. In 1975 it was determined that a) only three outfitters would

be permitted to run regularly scheduled raft trips, b) that a maximum of 30 customers could be carried per trip, c) that during the main summer use season only a limited number of trips would be permitted on a particular section of the river on weekends and holidays and d) a schedule for launches would be established to keep trips from bunching up.

By 1977-78 outfitters were using almost all of their alloted capacity on the weekends, and so the increase in commercial use has not come from this source. Instead it has come as commercial trips booked more people during the week when there was no limitation on number of trips and extended the season into the spring and fall.

The rational behind the limiting the commercial sector and not the private sector was based on the following factors. First, the commercial sector is a small group (three to seven) of readily identifiable users over which the Forest Service has definite control through the special use permit as opposed to thousands of individuals. Second, the commercial sector soon became the largest group of users now carrying two times as many people as travel privately at present. Finally, their scheduled operations permitted easy administration as opposed to the logistics of trying to man and regulate private users at ten access points during much of the year.

8. Existing studies on the Chattooga - Studies that have a direct bearing on the capacity of the river to provide recreation experiences are limited. The 1971 Chattooga River Wild and Scenic River Study Report to Congress that resulted in it classification was written when floating use was less than 800 per year and dealt with physical attributes rather than socicological.

The most complete study was in 1975 when Dr. Gordon Howard of Clemson prepared the "Chattooga River Visitor Survey". It utilized a mail out questionnaire to randomly selected private floaters who had filled out self registration forms when launching and names from commerical raft clients. The study analyzed the completed returns from 336 private and 357 commercial floaters to evaluate user perceptions, desires and opinions on different management options.

Howard followed this study the following year with a study designed to learn why use had declined and further refined use patterns. However, it has not been published to date.

In 1979 Dr. John Currier of the Forest Service implemented a water quality study to learn the impacts of boaters on the water quality in the river. This study has shown that there is no significant lowering of the water quality that can be attributed to boaters. In general the Chattooga's water quality is very good with the highest biological counts coming after storms from acricultural sources.

D. RECREATION USE FIGURES

The Chattooga has had a very dramatic increase in floating use from a reported 100 days in 1969 to over 36,000 in 1979. The figures prior to

about 1973 can be characterized as best guesses. In 1973 and 74 figures were estimated based on actual counts by river rangers and then expanded to cover the periods when the stations were not manned.

In 1975 a self-registration system in use today was established for the river with stations at the major entry points. Visitors filled out a permit, placing the original in a box at entry point and kept the carbon copy. The River Rangers spot check permits, writing citations to those who ignored the direction to register, in an attempt to obtain as complete information as possible. This information was coded and analyzed on the Forest Service computer for several years. It provided a good feel of use on the river.

In 1977 and 78 the computer program malfunctioned and would not analyze the data so use data was based on hand tabulation of registration slips and outfitter special use charges.

In 1979 the Forest Service contracted with Clemson University to compile the information on private users using a program developed by Gordon Howard.

The commercial use was detemined by compiling by hand the monthly use figures reported on commercial special use permits.

The figures shown in Table 3 are probably low by at least 5% since some users do not register because a) they rebel at registering, b) may launch at a point without a registration station or c) may not find a pencil or registration slip at the station.

E. CHARACTER OF THE CHATTOOGA

Topography is one of the variables useful in determining the potential of the river to conceal one party of users from another or to congregate users. James Kuska discusses three factors - gradient, rapids and sinuosity - that can have bearing on user patterns and perceptions of other users. The numerical figures as determined from topographic maps are shown in Table 5.

1. Gradient is the rate a river drops in a certain distance. This is often expressed in feet per mile. The following table shows that there are significant differences in the gradient on different sections of the Chattooga. The greater the gradient the faster the river flows and in general the faster the people floating move down stream.

   However, when the gradient is very steep it indicates rapids or waterfalls. If these are small drops, boaters move through them quickly. If they are large and difficult rapids boaters tend to stop, get out and scout or portage. This slows down movement and causes more opportunity for one group to overtake other groups.

2. Combined rapid class total is an indicator of the step effect in a river. To show this graphically the rapids class difficulty (numerical) in each one mile section was added together so that this factor could be displayed graphically. Thus if there were four Class

2 rapids and one Class 3 rapid the section would be assigned a rating of eleven. On the Chattooga the combined rapid class total for one mile sections ranges from a total of 2 on Section I to a total of 39 on Section IV.

On one mile sections with rating totaling 12 to 18, boaters not experienced with the section frequently stop and scout, causing more groups to overtake and pass groups. However, this is partially compensating as areas with rapids often produce noise that tends to block out voices of other parties. In addition rapids offer limited screening when one group is above and another is below the rapid.

3. Sinuosity provides greater sense of isolation to visual contact This is the amount of bending in a river and it relates down river viewing distances of one portion with another. Sinuosity was determined by comparing the ratio of a two mile portion of the river to the straight line distance between the two mile river points. These ranged from 1.17 (very straight) to 3.90 which indicated great bending and resulting poor visability.

   A study needs to be undertaken to learn how the gradient, combined rapid class total and sinuosity interrelate to either reduce or increase the perception of crowding on the various sections of the Chattooga.

F. CARRYING CAPACITY CONSIDERATIONS

Carrying capacity is the maximum number of living things (in this case floaters) that can be supported by the ecosystem (the river) during the most critical period of the year without causing harm. Three major elements comprise the recreation carrying capacity concept - physical, biotic and social. The physical carrying capacity, which includes the limitations of non-living components of a site such as soils or available parking space is the easiest to measure. The biotic carrying capacity which includes the impact on living organisms such as vegetation, wildlife, aquatic, water quality etc. can also be measured fairly easily. The social capacity involves the impact on people on one another while competing for the same or related experiences.

Unfortunately trying to set a carrying capacity is a nebelous job as many factors, opinions experiences and objectives are encountered. Many contemporary authors argue that a carrying capacity determination is impossible (and not desirable) except in the most limited of situations.

Establishment of a carrying capacity below demand presupposed that some method will be used to determine who would not be permitted to utilize the river in the manner they are accustomed (time of day or month, section of river, number of trips per year, etc.).

Several studies and reports were used extensively in the preparation of the Chattooga Study. Included in these are McCool and Utter's "Wild River Carrying Management, A Case Study of Use Permit Allocation on the Middle Fork of the Salmon River", Gordon Howard's "Chattooga River Visitor Survey" and Shelby and Danley's "Allocating River Use".

TABLE 5

RIVER MILE	LOCATION	GRADIENT	SUM OF RAPID CLASS	SINOUSITY
27.8	WEST FORK LAUNCH			1.42
		5'	0	
27				1.33
		13'	4	
26				1.33
		15'	2	
25	SECTION I ↓			1.29
		8'	2	
24				1.52
	HW 28 LAUNCH	2'	2	
23	↑			1.14
		10'	2	
22				1.58
		18'	8	
21	SECTION II			1.67
		22'	9	
20				2.77
		10'	10	
19	↓			2.19
		10'	10	
18				1.33
	EARL'S FORD	10'	8	
17	↑			1.94
		15'	4	
16				2.00
		25'	12	
15				1.50
		65'	16	
14				1.58
		30'	17	
13				2.63
		35'	17	
12	SECTION III			1.58
		20'	8	
11				1.39
		15'	20	
10				1.27
		30'	13	
9				1.64
		10'	16	
8				1.72
		30'	8	
7				1.74
		25'	13	
6	↓			3.90
	HW 76 BRIDGE	40'	18	
5	↑			1.54
		30'	9	
4				1.33
		80'	20	
3				1.12
		40'	24	
2	SECTION IV			1.17
		35'	18	
1	↓			1.54
		55'	39	
0	TUGALO LAKE			-

1. The physical carrying capacity is the easiest capacity to determine. On the Chattooga, there is adequate capacity for parking lot expansion, road access, portage trails, etc. to accommodate floating use leaves much higher than can be anticipated. While there is some physical site damage and compaction from foot traffic, with good site maintenance this could be reduced to negligible amounts at all launch sites other than Earl's Ford. The launch areas are in much better shape now than five years ago when vehicle use was permitted. At Earl's Ford erosion is occurring during flood state but this will not impose limitations.

2. No serious limitation of the biotic carrying capacity is foreseen. The Water Quality Study by John Currier indicates that far more boating use could be permitted before water quality degradiation would be a limiting factor. Cursory observation indicates that no impacts to vegetation, wildlife, aquatic life are occurring and no problems are foreseen even if use increased significantly.

3. This leaves the social carrying capacity as the one that would be the first to be reached or exceeded. Unfortunately it is also the one that is hardest to grasp and set. At present there is insufficient data to set a precise limit.

   The most definitive study to date was done by Gordon Howard. However, this study has several biases that require additional study be done to bring it up to date.

   First, only 20% of his commercial respondents floated the river on the weekend when the river use is at the highest and conflict potential is greatest. Second, the overall use by floaters has increased 60% from an estimated 22,800 people in 1975 when the study was made to 36,666 during 1979. However, this increase is not as significant as it first appears since the commercial use on weekends has not increased dramatically because of the limits placed on how many clients can be carried.

4. Analysis of studies - This current study seems to determine how the Chattooga River should be managed in keeping with the goals of the legislation and the desires of the public. Howard's study asked a number of pertinent questions that reveal how people were thinking. These include the question "I float the Chattooga River because I like to" and provided 13 situations for users to respond to. See Table 6 for private user responses and Table 7 for commercial responses.

   Eight of the options do not relate to how many other users are present and could be equally done on a crowded or low use day. Two of the situations (#6 and 11) might be considered to indicate that a greater number of other boaters would reduce the quality of their experience since more people might detract from the scenery or the chance to observe wildlife. I feel this is not a realized experience for very many individuals since on only one float out of about thirty-five times on the river have I seen a deer or other large animal.

Table 7

"I Boat On The Chattooga River Because I Like To:"
Private Users*

	Reason	N**	Strongly Agree n	Strongly Agree %	Agree n	Agree %	No Opinion n	No Opinion %	Disagree n	Disagree %	Strongly Disagree n	Strongly Disagree %
1)	Take my family on the River.	308	55	17.8	84	27.3	121	39.3	29	9.4	19	6.2
2)	Meet the challenge of whitewater.	319	203	63.6	101	31.7	8	2.5	7	2.2	0	0.0
3)	Improve my boating skills.	315	147	46.6	124	39.4	33	10.5	10	3.2	1	0.3
4)	Enjoy the clean air.	317	183	57.7	119	37.6	11	3.5	3	0.9	1	0.3
5)	Meet new people.	314	42	13.4	88	28.0	125	39.8	40	12.7	19	6.1
6)	Enjoy the scenery.	317	230	72.6	80	25.2	6	1.9	1	0.3	0	0.0
7)	Get away from people.	313	90	28.8	104	33.2	95	30.3	14	4.5	10	3.2
8)	Experience wilderness and isolation.	316	148	46.8	125	39.6	32	10.1	8	2.5	3	1.0
9)	Forget about my problems.	313	76	24.3	93	29.7	108	34.5	22	7.0	14	4.5
10)	Enjoy the companionship of friends.	315	124	39.4	157	49.8	26	8.3	5	1.6	3	0.9
11)	Observe wildlife.	314	108	34.4	135	43.0	61	19.4	8	2.6	2	0.6
12)	Fish as I boat.	314	6	1.9	16	5.1	127	40.4	91	29.0	74	23.6
13)	Watch other boats run the rapids.	314	36	11.5	125	39.8	100	31.8	32	10.2	21	6.7
14)	Get out of the city awhile.	312	119	38.1	130	41.7	44	14.1	11	3.5	8	2.6
15)	Get some physical exercise.	317	161	50.8	127	40.1	24	7.6	3	0.9	2	0.6

*All rows total to 100%.

**The N's vary because not every respondent chose to rate each reason.

Table 6

"Boating Use Of The River Should Be Controlled By:"
Private Users*

Management Option	N**	Strongly Favor n	Strongly Favor %	Favor n	Favor %	No Opinion n	No Opinion %	Oppose n	Oppose %	Strongly Oppose n	Strongly Oppose %
Issuing a limited number of permits only on a first come, first served basis.	170	12	7.1	43	25.3	14	8.2	55	32.3	46	27.1
Issuing a limited number of permits only through telephone reservations.	170	14	8.2	40	23.5	27	15.9	52	30.6	37	21.8
Issuing a limited number of permits only through mail reservations.	166	22	13.3	35	21.1	18	10.8	58	34.9	33	19.9
Issuing a limited number of permits only through a daily lottery of all boaters present at a specified time.	169	0	0.0	7	4.1	11	6.5	42	24.9	109	64.5
Charging a daily entrance (use) fee.	169	11	6.5	22	13.0	30	17.8	34	20.1	72	42.6
Charging for the use of the river by the hour.	171	0	0.0	0	0.0	3	1.8	43	25.1	125	73.1
Limiting the number of trips that an individual could take during the peak use months.	171	16	9.4	33	19.3	26	15.2	47	27.5	49	28.6
Requiring a one-quarter mile portage to get to and from the river.	172	35	20.3	45	26.2	35	20.3	33	19.2	24	14.0
Requiring a one-half mile portage to get to and from the river.	170	11	6.5	24	14.1	41	24.1	48	28.2	46	27.1
Limiting the number of boats in a group.	171	20	11.7	62	36.3	31	18.1	39	22.8	19	11.1
Limiting the number of people in a group.	169	13	7.7	65	38.5	32	18.9	37	21.9	22	13.0
Launching groups ONLY at 10 minute intervals.	167	11	6.6	39	23.4	50	29.9	49	29.3	18	10.8
Launching groups ONLY at 20 minute intervals.	169	11	6.5	41	24.3	54	31.9	37	21.9	26	15.4
Launching groups ONLY at 30 minute intervals.	167	18	10.8	17	10.2	44	26.3	51	30.5	37	22.2
Limiting the use of the river to boaters from the States that border on the river (S.C., N.C., and Ga.)	172	6	3.5	6	3.5	15	8.7	41	23.8	104	60.5
Doing away with commercial outfitters and other special permit users.	168	21	12.5	24	14.3	36	21.4	50	29.8	37	22.0
Channeling ALL river use through commercial raft and guide services (no private boater trips).	172	3	1.7	0	0.0	1	0.6	11	6.4	157	91.3
Requiring each boater to pass a skills test.	171	31	18.1	48	28.1	44	25.7	33	19.3	15	8.8
Requiring each craft to carry at least 2 persons.	173	20	11.6	16	9.2	10	5.8	30	17.3	97	56.1
Requiring each craft to carry 4 persons (could mean fewer boats but more people).	172	0	0.0	3	1.7	12	7.0	34	19.8	123	71.5
Prohibiting the carrying of more than 2 people per craft (could mean fewer people but more boats).	168	7	4.2	14	8.3	32	19.1	53	31.5	62	36.9

*All rows total 100%.

**The N's vary because not every respondent chose to rate each management option

Two of the reasons given would definitely be lessened by crowds. These are (#7) the desire to get away from people and (#8) to experience wilderness and isolation. These responses are shown as follows:

Reason	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
Get away from people (pvt users)	28.8%	33.2%	30.3%	4.5%	3.2%
(comm users)	21.8%	31.1%	32.5%	11.9%	2.7%
Experience Wilderness and isolation (pvt users)	46.8%	39.6%	10.1%	2.5%	1.0%
(comm users)	40.5%	44.0%	13.4%	1.2%	.9%

On one question it could be argued that increased numbers of boaters would heighten the experience. This is (#13) -watch other boats run the rapids- since the more boats the greater the opportunity to watch. The number of respondents in agreement to this form of enjoyment was 51.3% in favor compared to 16.9% disagreeing.

5. Perception of Crowding - Numerous studies have shown that recreationists perceive crowding based on the number and/or size of groups encountered as well as the activity the other group is performing. Floaters in kayaks thus would be more tolerant of other kayaks than raft or inner tubes while small groups are more tolerant of small groups than large groups.

   Howard sought to determine how many other groups private users would tolerte before considering the river to be crowded. Their responses were:

Number of Groups	Percent	Cumulative Percent
1-2	4.2	4.2
3-4	20.1	24.3
5-6	24.1	48.6
7-8	17.8	66.4
9-10	12.9	79.3
11-15	7.4	86.7
$\geq$ 16	13.3	100.0

   Only 10% of Howard's private users perceived the river as being crowded. This is probably due to their statement that 78% of their parties were overtaken by three or fewer other groups and 81% overtook three or fewer groups. Studies have shown that inexperienced observers underestimate the number of contacts they have with other groups which may allow a river to handle extra floaters.

   One problem with the above study is that sufficient information was not collected to corrolate how many people were on the river or the section in question on the dates the respondents floated the river. If the majority of the respondents floated during the week, the increase in use that has occured since his study was made and the higher use on weekends might increase the perception of crowding to intolerant levels. This is another area where more study is needed.

When asked if they favored prohibiting commercial rafts, most private boaters said no. The commercial floaters also favored retention of the private floaters.

The average difference in floating speed is not great with kayaks traveling fastest and rafts slowest. Given adequate spacing, the number of times one group would overtake another group is low. However, the time required for different groups to run a rapid varies greatly. When the rapid class is 3 or higher, inexperienced boaters often spend a lot of time scouting or portaging while experienced boaters move through rapidly. The major points of concentration of boaters are:

Section I	Section II	Section III	Section IV
None	Big Shoals	Dicks Creek	Woodall Shoals
		Second Ledge	Cork Screw
		Painted Rock	Crack in Rock
		Bull Sluice	Sockem Dog

By far the most congested point on the river is at Bull Sluice. It is really jammed when two or more commercial raft trips get off schedule and arrive at the same time as large numbers of private floaters. This point is 300 yards from the end of the Section III trip and 500 yards from the major Highway 76 crossing. This congestion attracts large numbers of people to view the rapid. The large number of floaters probably heightens their experience, as there are few opportunities to view boaters on a Class 5 rapid.

Boaters tend to concentrate their launch times further increasing the chances for conflicts and meeting other groups. Table 8 shows the distribution of private launch times at the major entry points. A three hour range captures 59 to 87% of the boaters at the major access points.

TABLE 8

TIME OF LAUNCH FOR PRIVATE BOATERS BY ACCESS POINT

TIME	HW 28		EARL'S FORD		HW 76	
8-9 am	2.2%		4.0%		1.7%	
9-10 am	9.3%		14.0%		6.9%	
10-11 am	18.8%		35.2%	79.5%	36.9%	
11-12 am	20.9%	59.5%	30.3%		29.6%	87.0%
12-1	19.8%		11.9%		20.5%	
1-2 pm	13.0%		1.0%		4.5%	
2-3 pm	8.8%		1.0%		-	
3-4 pm	3.6%		1.0%		-	
4-5 pm	2.6%		1.6%		-	
5-6 pm	1.0%		1%		-	
NOT GIVEN	325 permits	18.6%	981 permits	19.2%	319 permits	20.1%

The heavy use season is May 15 - September 16, a period of 124 days during which the river was used by 26,977 floaters. A total of 13,355 floaters were present on the 36 weekend days during this period for an average of 378 people/day. During the 88 week days, 13,622 people floated, making an average of only 154. Thus, average use on a weekend day is 2 1/2 times as heavy as during the week.

This type information could be made available to persons seeking a river experience with fewer people. They could then elect to depart earlier than the rush, wait until most had passed down river, or pick a low use day.

The following charts (#1, 2, 3) were prepared to determine where the majority of floaters would be at any particular time. They are based on the launch times given on registration slips and average length of float trips shown on the river map. Since floating time increases as water levels decrease, charts were prepared for high water (3.0 feet at Highway 76 Bridge), medium (2.0 feet) and low (1.0 feet). In addition since kayaks tend to move fastest and rafts slowest, further dispersal of craft results in a wedge shaped area of floater use.

At 3.0 feet Commercial Section III trips launch from Fall Creek which is 7 1/2 miles down stream from Earl's Ford where most private trips originate. Chart #3 shows that they generally stay ahead of all but the fastest private canoes and kayaks, thus avoiding conjestion.

Launch Point 2 -- Highway 28

Heaviest canoe, raft and kayak use is during June, July, August and early September with significant Saturday use in May. For the period May 1 - Sept 30 the average number of craft per day was:

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL
Canoe	3.2	2.7	3.1	1.9	3.6	13.6	8.8	36.9
Raft	0.8	0.5	0.8	1.1	0.8	5.6	2.2	11.8
Kayak	0.2	0.8	0.0	0.3	1.1	3.4	2.9	8.7
TOTAL	4.2	4.0	3.9	3.3	5.5	22.6	13.9	57.4

The heaviest innertube use occurs during the warmer months of July, August and mid-September. The "critical window" of private use lies between 1000 and 1300 with a spurt at 1400.

July 1 -- Sept 16

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL
Tubes	2.5	1.2	1.0	1.1	3.2	13.0	6.0	28.0

Launch Point 3 -- Long Bottom Ford

Canoe, raft, and kayak use incidential. Occasional large innertube parties occurred on Saturdays and Mondays June through mid-August. The "critical window" of private use lies between 1000 and 1300.

CHART 1 Diagramatic location of major body of floaters during typical days at different hours of the day when water level at the Highway 76 gauge is 1.0 feet.

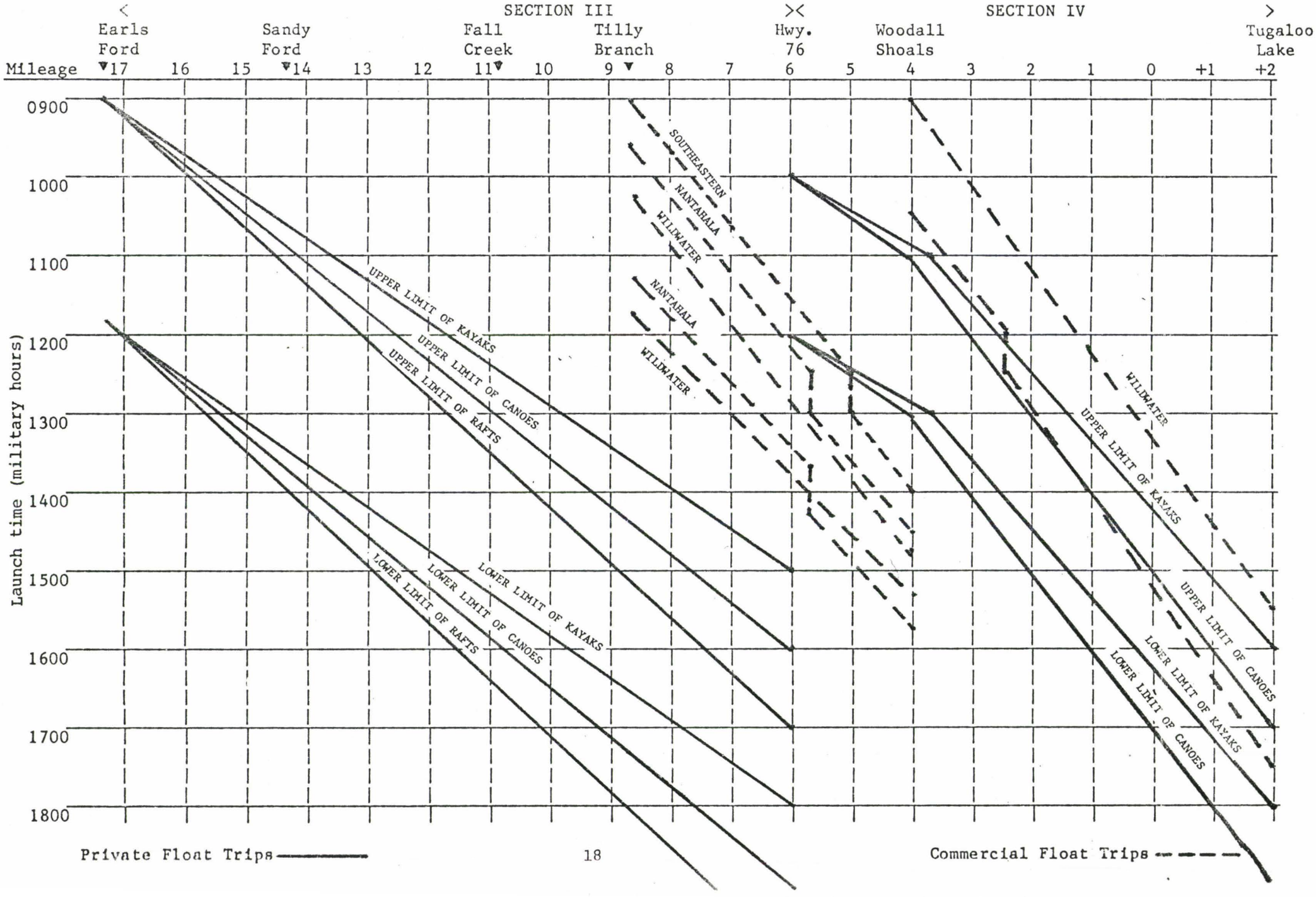
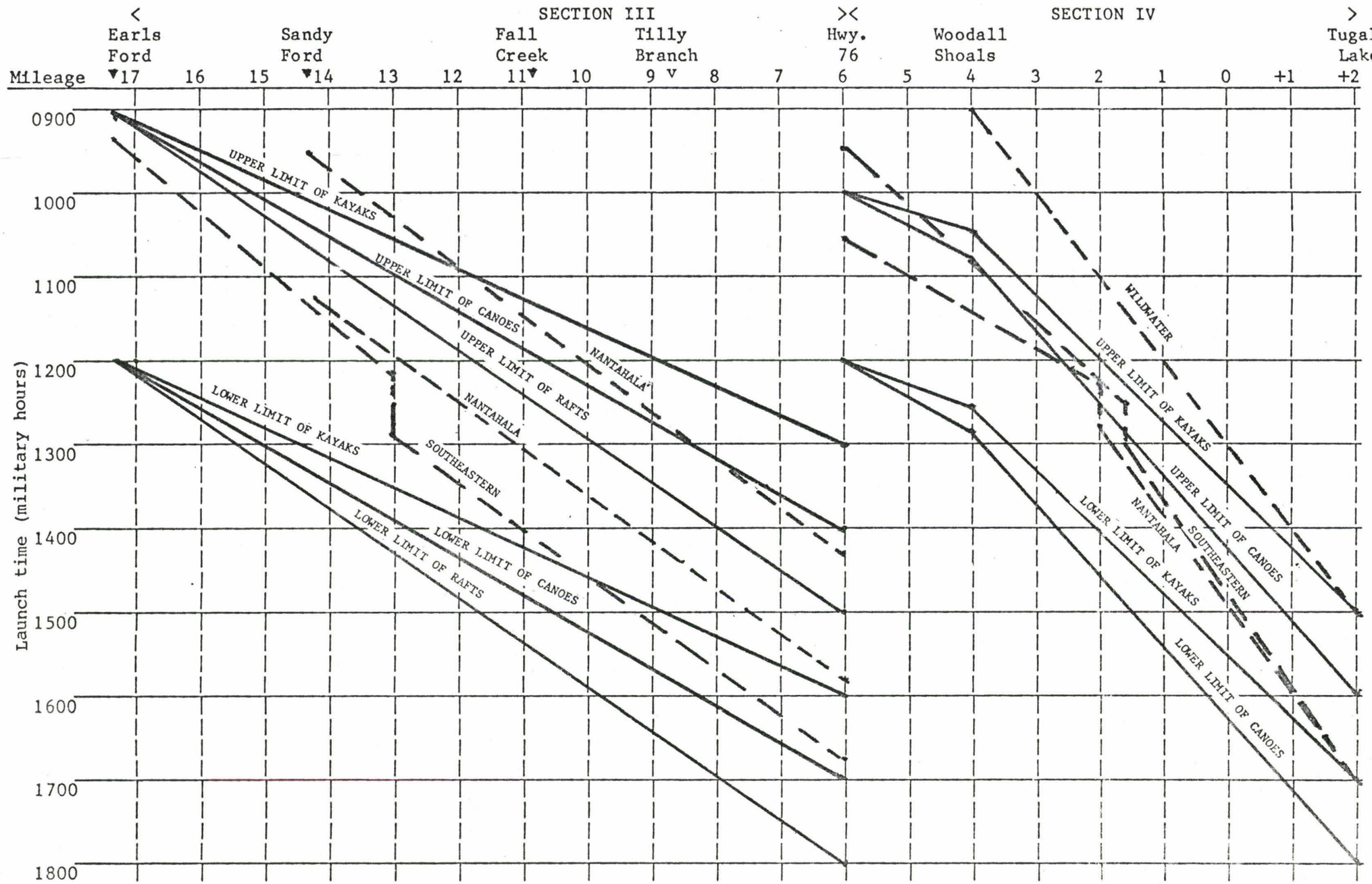
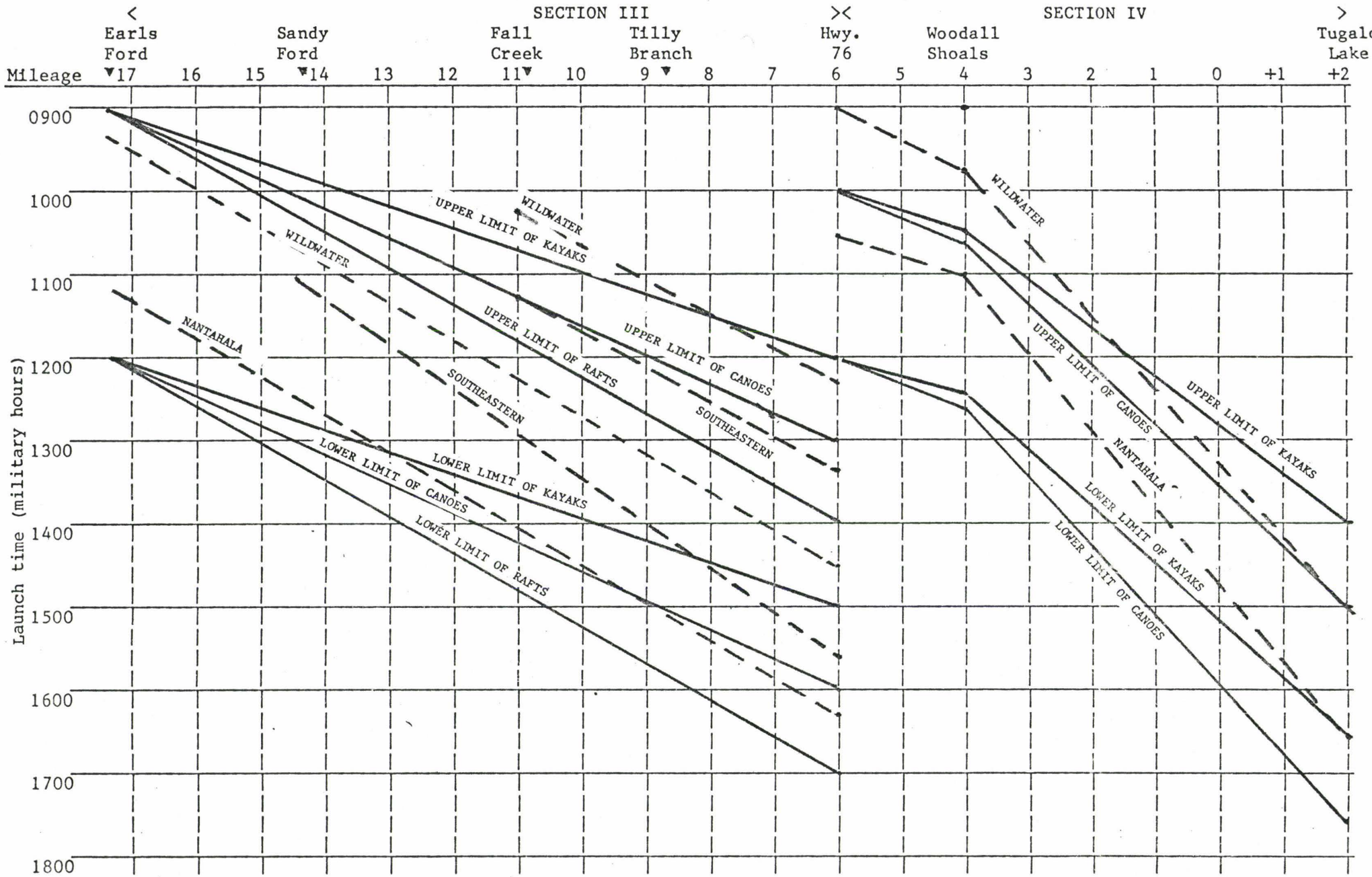


CHART 2 Diagramatic location of major body of floaters during typical days at different hours of the day when water level at the Highway 76 gauge is 2.0 feet.



Private Float Trips ———— Commercial Float Trips — — — —

CHART 3 Diagramatic location of major body of floaters during typical days at different hours of the day when water level at the Highway 76 gauge is 3.0 feet.



Private Float Trips ———— Commercial Float Trips — — — —

Launch Point 4 -- Earl's Ford

Heavy canoe, raft and kayak use occurs from mid-May through mid-September. There is sporadic heavy use in late April on weekends. Holiday use was not significant for rafts, but was for canoes and kayaks. For the period May 1 - Sept 30 the average number of craft per day was:

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL
Canoe	4.5	4.0	4.5	6.5	6.5	36.6	31.9	94.5
Raft	1.2	0.8	1.5	0.6	1.5	15.3	8.5	29.4
Kayak	3.3	2.5	4.2	1.9	4.0	26.0	27.1	69.0
TOTAL	9.0	7.3	10.2	9.0	12.0	77.9	67.5	192.9

Launch Point 5 -- Sandy Ford

Canoe, raft and kayak launch is incidential; this may change when the new Sandy Ford Road becomes known.

Launch Point 6 -- Highway 76

Heaviest use is by kayaks between late June and mid-September. Private use of canoes and rafts is low and holiday use is significant only from kayaks. During June 16 - Sept 16 the average number of craft per day was:

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL
Canoe	1.0	2.2	0.7	1.2	0.8	5.6	7.1	18.6
Raft	1.2	0.5	0.2	0.2	0.2	2.9	3.4	8.6
Kayak	4.3	3.1	3.1	2.5	4.6	14.1	22.0	53.7
TOTAL	6.5*	5.8	4.0	3.9	5.6	22.6	32.5	80.9

* Mostly from Labor Day

The "critical window" of private use lies between 1000 and 1200.

Launch Point 7 -- Woodall Shoals

Private canoe, raft and kayak use is incidental; this may change when the parking lot is completed.

Launch Point 9 -- West Fork

Canoes and tubes sporadically have group use in summer. Raft and kayak use is incidental.

Launch Point 10 -- Fall Creek

Private canoe, raft and kayak use is sporadic during June, July and August.

Launch Point 11 -- Thrift's Ferry

Private canoe, raft and kayak use is incidental.

The analysis of the private floater registration data indicated that 13,390 people floated the Chattooga in 1979. The overall average group size was 5.25 people (Highway 28 = 4.7 people, Earl's Ford = 5.4 people and Highway 76 = 5.3 people).

Eighty-five percent of the total floating use occurs during five months - May through September. The analysis showed the following floating pattern during the highest use periods.

This information is presently being used to regulate commercial trips. One major commercial put in point is Fall Creek which is midway through Section III. Raft trips starting at Fall Creek are seldom overtaken by private users starting at Earl's Ford and passes Highway 76 after most of the other traffic has left. The information is also is used to set limits on launch times for commercial instructional clinics.

Howard's study then asked "boating use of the Chattooga should be controlled by" and listed twenty-one possible strategies (see Table 31). On only three of the management options did a majority of the respondents indicate approval. These were a) requiring a 1/4 mile portage to get to and from the river (which has been implemented) and b) limiting the number of boats in a group and c) limiting the number of people in a group. They strongly opposed any system to issue a limited number of permits, charge a fee or require a time interval between parties.

G. FUTURE WORK NEEDED TO SET A CARRYING CAPACITY

A questionniare study and observations of floater use patterns is under way at the present time by Carrol Townsend of North Carolina State University but the data is not sufficiently developed to incorporate into this study. Further study is needed to determine what impact one group of users has on another, and how many contacts take place on days with different number of users. This study can best be done through the following steps.

Step 1. Determine who passes who on trips. As groups launch on observation days they would be numbered consecutively with large numbers visable from shore and the launch time recorded. Observers at downstream stations would log the time each group passes their station. This would permit an accurate determination of how many times parties are passed/or pass other groups. This would be analyzed on the basis of how many floaters were on that section during the observation period.

Step 2. In conjuction with the observation program a survey based on either interviews or mail questionnaire should undertake to learn how the visitors experience was affected by other users. The study should also seek to learn what a floater would be willing to forego if he/she feels that too many users detracted from the trip. All too often the recreationist is not forced to realize that to get one level of experience he may have to give up something i.e. not come as often.

Step 3. With the benefit of the studies, statements would be prepared and approved by line officers describing the experience level that the Chattooga should provide.

A goal statement might read - A party of not more than eight boats or twenty people should be able to float Section III without encountering over three other groups (with the exception of Bull Sluice) on all but the six highest use days of the year. It is probable that different goal statements would be used for different sections since it appears that different motives for floating are involved. It is also possible that on certain days different restrictions might be applied. For example on Monday, perhaps only a limited number of boaters could use the river or perhaps commercial trips would be prohibited on Section III on that day. Thus the limited number of boaters who really felt that it was important to have access to a low use river could be accommodated while a much larger group who did not worry about larger number of boaters could also enjoy the river on other days.

Step 4. As an immediate program to help those seeking solitude, information on times of launching and days of low use should be made available. This will let the solitude seeker decide to launch at 7 AM if he wants to and never see another floater in most cases.

H. RECOMMENDATIONS

Jim Culp (former river administrator), Ron Lindenboom and I feel that the present use with the excep tion of a half dozen or so high use weekends has not reached the point where it is seriously detracting from a significant number of floaters experiences.

The three five-year raft trip permits held by Wildwater, Southeastern and Nantalaha will expire on December 31, 1982. The seven one-year clinic permits will expire at the end of 1980. It is desirable for company stability to hold a permit from several years so that investments can be budgeted and amortized. It is also beneficial to the Forest Service to have a longer permit period to reduce the time and expense of securing satisfactory permittees. However, when entering into long term permits it is possible that use will increase above the ability of the river and cutting back commercial use would probably involve court action and breech of contract. Therefore it is prudent to be conservative. With this in mind, the following policies are recommended:

1. During 1980, advertise and select a maximum of six companies to provide clinic or instructional services. The permit would be for a two-year period to expire on December 31, 1982 when the rafting

permits expire. At that time both instructional and rafting permits would be made for five-year periods.

2. No change will be made in the number of commercial rafting companies (three at present) or in the number of trips or number of clients per trip unless studies tht may be done in the future indicate a need for such change.

3. There is insufficient data to show that a limitation should be placed on the total number of private floaters who can use a section of the river on any given day. Considering the difficulty of the Forest Service to enforce limits and the hardship of the public in complying with such regulations, we feel that a significant amount of increase floating would be necessary to justify this move since private use is about one third of the total.

4. Commercial use for clinics will not interfer with the low amount of private use on Section II. Therefore clinics on this section should be able to start trips at whatever time and whatever day of the week they choose.

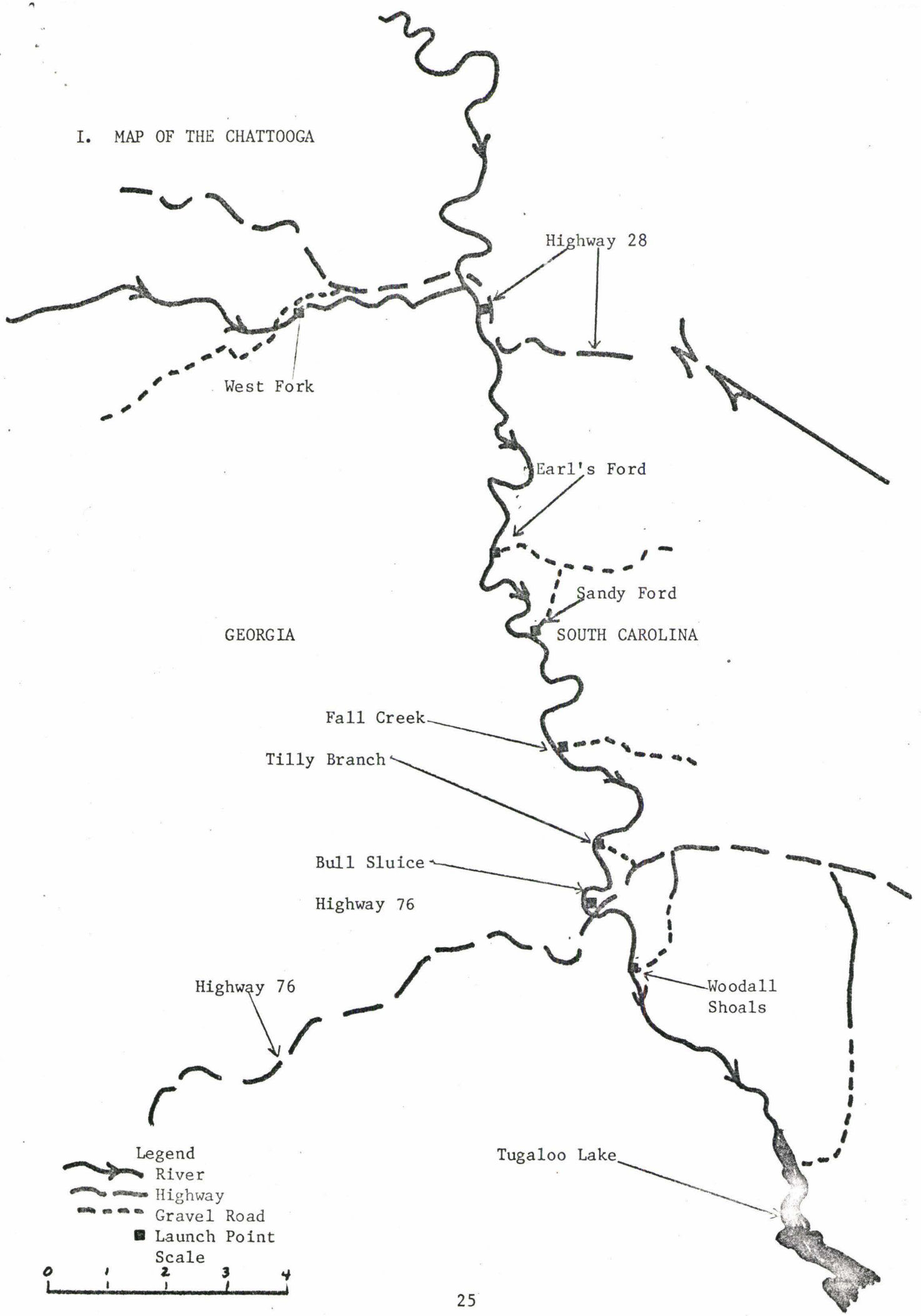
5. For Section III clinics, the following launch time restrictions from May 15 through September 15 on weekends and holidays should be utilized:

Station	Water Level + 1.5 feet	Water Level below 1.5 feet
Earl's Ford	Noon or later	Noon or later
Sandy Ford	9 a.m. or earlier	10 a.m. or earlier
Fall Creek	10 a.m. or earlier	Noon or earlier
Thrift's Ferry	11 a.m. or earlier	No Launching

When the water level is below 1.5 feet no clinic use will be permitted from Tilly Branch to Highway 76.

Section IV clinics could be permitted to start at Highway 76 Bridge after 1430 on week days and not impact significant numbers of floaters. Clincs should not be permitted below Highway 76 on weekends.

I. MAP OF THE CHATTOOGA



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